Evaluation of Patients with Suspected Influenza in the 2016 Winter Season

2016 Yılı Kış Sezonundaki Grip Şüpheli Hastaların Değerlendirilmesi

Evaluation of the Patients with Suspected Influenza

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Öz

İnfluenza virüslerinin neden olduğu grip, hafif seyirli spontan gerileyen hastalık tablosundan, ölümcül pandemilerle seyreden ağır hastalık tablosu gibi geniş bir yelpazeye sahiptir. Çalışmamızda 2016 yılı kış sezonunda Sivas Numune Hastanesi'ne grip şüphesi ile başvuran ve nazofarengeal sürüntü örnekleri alınan hastaların klinik ve laboratuvar özelliklerini analiz etmeyi amaçladık. Çalışmaya dahil edilen 34 hastanın 19'u erkek, 15'i kadındı. Yaş ortalaması 43.9±16.5 (en düşük17- en yüksek74) 'du. Hastaların 20'sinde (%57.1) komorbid hastalık mevcuttu. Hastaların 20'sinin (%57.1) akciğer grafisinde infiltrasyon vardı. Hastaların beyaz küre değerleri ortalama 9.645±7.446 (103 µL), C-reaktif protein değerleri ortalama 4.6±4.7(mg/dL), kreatin kinaz değerleri ortalama 579±1.725(µL) idi. Nazofarengeal sürüntü sonuçlarında dokuz (%26.4) hastada H1N1, yedi (%20.5) hastada H3N2, üç (%8.8) hastada Influenza B tespit edildi. Sekiz hasta ex oldu. Komorbiditesi olan hastalarda mortalite yüksek bulundu (n=8, p = 0.008). Hastaların yoğun bakım ünitesine yatışında beyaz küre (p = 0.003), nötrofil (p = 0.002), kreatinin (p = 0.02), AST (p = 0.001), ALT (p = 0.04) değerlerinde anormallik, komorbidite durumu (p = 0.02) ve akciğer grafisinde infiltrasyon olmasının (p = 0.02) etkin rolü olduğu istatistiksel olarak saptandı. Sonuç olarak, genel durumu kötü, laboratuvar parametreleri bozuk, akciğer grafisinde infiltrasyonu olan hastaların yoğun bakım ünitesinde yakın takibi ve multidisipliner hekim yaklaşımı uygundur. Influenza, komorbid hastalıkların varlığında daha ağır seyretmektedir. Bu nedenle mevsimsel grip aşısı komorbiditesi olan kişilerde büyük öneme sahiptir.

Anahtar Kelimeler

İnfluenza; Komorbidite; Mortalite

Abstract

Influenza, caused by influenza viruses, has a wide range from a mild form of spontaneously regressing disease table to a severe disease table showing a fatal pandemic course. In this study, we aimed to analyse the clinical and laboratory characteristics of patients who applied to Sivas Numune Hospital in the winter season of 2016 with the influenza-suspect and for whom nasopharyngeal swab samples were taken. Nineteen of the 34 patients included in the study were male and 15 were female. The average age was 43.9±16.5 (min17- max74) years. Comorbid disease was present in 20 (57.1%) of the patients. There was infiltration in the chest radiography of 20 (57.1%) of the patients. The average white blood cell counts of the patients were 9.645±7.446 (103 µL), the average C-reactive protein was 4.6±4.7 (mg/dL), and the average creatine kinase was 579±1.725 (µL). In the nasopharyngeal swab results, H1N1 was determined in nine (26.4%) patients, H3N2 in seven (20.5%) patients, and influenza B in three (8.8%) patients. Eight patients died. Mortality was found to be high in patients with comorbidity (n=8, p = 0.008). It was statistically determined that anomaly in white blood cell count (p = 0.003), neutrophil (p = 0.002), creatinine (p = 0.02), AST (p = 0.001) and ALT (p = 0.04) counts, comorbidity status (p = 0.02) and infiltration in the chest radiography (p = 0.02) had an active role in admission of patients to the intensive care unit. As a result, close follow-up with a multidisciplinary approach by physicians is appropriate for the patients in the intensive care unit who have a poor general condition, who have impaired laboratory parameters, and whose chest radiography indicates an infiltration. Influenza follows a more severe course in the presence of comorbid diseases. Therefore, the application of a seasonal influenza vaccine has great importance in patients with comorbidity.

Keywords

Influenza; Comorbidity; Mortality

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Introduction

Influenza is an acute and self-limiting inflammatory disease [1]. Influenza A and B viruses cause different epidemics at varying magnitudes each year [2]. The contagiousness of influenza infections, which clinically progress with symptoms such as fever, sore throat, cough, fatigue, myalgia, and headache, is high and the infections can spread rapidly [3]. People with chronic diseases, those over the age of 65, children under the age of 10, and individuals with suppressed immune systems carry a high risk of exposure to these infections and to the development of complications. Around the world, 10% of adults and approximately 20% of children have influenza infection each year [4]. Reducing the rate of these infections with vaccination and providing an early diagnosis will result in a reduced use of antibiotics. The early diagnosis of influenza in severe clinical cases ensures that appropriate antiviral therapy is applied .

In the study, we aimed to determine the demographic characteristics, laboratory findings, influenza positivity rates, and influenza types of patients who applied to Sivas Numune Hospital in the winter season of 2016 with influenza symptoms and to review the mortality status of these cases. We aimed to contribute to the literature by sharing the study results.

Material and Method

In the study, we examined patients who applied to the Infectious Diseases Polyclinic of Sivas Numune Hospital with the suspicion of influenza, and those hospitalised in different clinics and consulted by the Infectious Diseases Polyclinic in the winter season of 2016. In the presence of at least one of the influenza symptoms, such as fever (over 38°C) and widespread body ache, sore throat, headache, nasal discharge, cough, or respiratory distress, the patient was considered to be influenza suspect. Those whose nasopharyngeal swab samples were taken were included in the study. There were 34 patients who met these criteria.

The tests required to confirm the diagnosis of influenza in influenza-suspect patients and the typing of influenza in our province are carried out by the Samsun Public Health Institution. The nasopharyngeal swab samples were placed in the viral transport medium (Sigma VCM™) after being taken with the help of special swabs. They were kept at +4ºC for up to 72 hours and sent to Samsun Public Health Institution laboratory in compliance with the cold chain and biosafety guidelines and in accordance with the directive of the Ministry of Health to confirm the diagnosis of the influenza-suspect patients and to perform influenza typing. These samples were examined by the Samsun Public Health Institution for the presence of the RNA of influenza A and B by the real-time reverse transcription polymerase chain reaction (rRT-PCR) and the results were reported to our unit by e-mail.

Other laboratory results (white blood cell, haemoglobin, platelet, liver function tests, C-reactive protein, creatine kinase) and the chest radiographs of these patients were retrospectively examined.

The data obtained in our study were uploaded to SPSS (Version 22.0) software. In the evaluation of the data, the significance test of the difference between two means in the independent groups was used when the parametric test assumptions were met (Kolmogorov-Smirnov). The Mann-Whitney U Test and the Chi-Square Test were used when the parametric test assumptions were not met, and the error level was taken as 0.05. For our study, an approval was obtained from the Non-Invasive Clinical Research Ethics Committee of Cumhuriyet University. (Decision no: 2016-04/08)

Results

Thirty-four patients were included in the study, 19 male and 15 female. The average age was 43.9±16.5 (min17- max74) years. The patients applied to our hospital between the dates of 4 January 2016 and 16 February 2016. Fifteen (42.8%) of the patients were hospitalised. Nine of these patients were followed up in the intensive care unit (ICU). Comorbid disease was present in 20 (57.1%) of the patients; these diseases were: seven cases of hypertension, six cases of Chronic Obstructive Pulmonary Disease (COPD), five cases of coronary artery disease, three cases of hypothyroidism, two cases of chronic renal failure, two cases of anemia, two cases of asthma, one case of Acute Myeloid Leukemia, one case of Chronic Myeloid Leukemia, one case of Rheumatoid Arthritis, one case of cerebrovascular disease, and one case of chronic Hepatitis C. There was infiltration in the chest radiography of 20 (57.1%) of the patients. The average white blood cell count was 9.645±7.446 (103 µL), average C-reactive protein (CRP) was 4.6±4.7 (mg/dL), and average creatine kinase (CK) was 579±1.725 (µL). Thirty-two patients were administered oseltamivir treatment. Two untreated individuals were the patients who applied to the hospital 48 hours after the onset of symptoms and who had good general condition. In the nasopharyngeal swab results, H1N1 was determined in nine (26.4%) patients, H3N2 in seven (20.5%) patients, and influenza B in three (8.8%) patients. Eight (22%) patients died; while three of these patients were H3N2 positive, the swab results of the other five patients were negative (Table 1).

Upon investigating the relation between the laboratory results of the patients who died, significant results were obtained with white blood cell, neutrophil, creatinine, and AST counts (p=0.002, 0.005, 0.001, 0.004, respectively). Mortality was also found to be high in the patients with comorbidity (p = 0.008) (Table 2).

Upon evaluating the laboratory results of the patients with positive influenza results, a significant result was obtained only in the anomalies in the platelet counts (p = 0.02). The platelet counts of the influenza-positive patients were lower than those of the influenza-negative patients (Table 3).

It was statistically determined that the anomaly in the white blood cell (p = 0.003), neutrophil (p = 0.002), creatinine (p = 0.02), AST (p = 0.001), and ALT (p = 0.04) counts, comorbidity status (p = 0.02) and infiltration in the chest radiography have an active role in the admission of patients to the intensive care unit.

Discussion

Influenza is a disease that threatens the health of the community and that causes school absenteeism and workforce loss. Influenza viruses are responsible for 30-50% of the workforce loss in adults [5]. Influenza has social and economic effects be-

Table 1. Demographic and laboratory characteristics of the patients

Age range			17 – 74
Age average			43.9±16.5
Gender	Female		n=15
	Male		n=19
Comorbid diseases			n
Hypertension			7
COPD			6
Coronary artery disease			5
Hypothyroidism			3
Chronic renal failure			2
Anemia			2
Asthma			2
Acute Myeloid Leukemia			1
Chronic Myeloid Leukemia			1
Rheumatoid Arthritis			1
Cerebrovascular disease			1
Chronic Hepatitis C			1
Outpatient or Hospitalization			
Outpatient			19
Hospitalization			15
	Hospitalization in ICU		9
	Hospitalization in clinics		6
Laboratory Values	Min	Max	Average
WBC (103 µL)	2.1	32.5	9.645±7.446
Hb (g/dL)	10	15.9	13.9±1.4
Plt (103 µL)	97	372	189±66.498
CRP (mg/dL)	0.1	15.3	4.6±4.7
AST (µ/L)	12	175	44.1±39.7
ALT (µ/L)	9	146	36.2±31.0
CK (µ/L)	38	9118	579.6±1725
Creatinine (mg/dL)	0.5	7.5	1.5±1.8

Table 2. Evaluation of the effect of the demographic characteristics and laboratory data of the patients on mortality

	Mortality not available	Mortality available	p
Age	40±15.7	56.7±12.8	0.31
Female/Male	12/14	3/5	0.67
Wbc	7.649±6.266	16.774±7.314	0.002*
Hb	13.8±1.3	14.2±1.6	0.45
Plt	183.88±57.74	207.57±94.86	0.66
CRP	3.5±3.6	8.6±6.0	0.16
AST	33.8±26.0	79.2±58.7	0.004*
ALT	31.3±30.3	53.7±28.9	0.05*
CK	247.5±281.8	1528±3351	0.12
Creatinine	1.0±0.98	3.33±2.94	0.001*
Comorbidity	12 (%46.2)	8(%100)	0.008*
Infiltration in chest X-ray	13 (%50)	7(%87.5)	0.19

*p < 0.05

cause hospitalisation is sometimes required and because of the increasing cost of treatment. For this reason, influenza activity in the world has been monitored by the Global Influenza Surveillance Network (GISN) established by the World Health Organization (WHO) in 1952. In 2011, the WHO increased its monitoring and now continues its work under the name "Global Influenza Surveillance and Response System (GISRS)" with six participating centers, 140 national influenza reference centers in 110 countries, and eleven H5 reference centers. Surveillance findings of national influenza reference centers in GISRS are shared through the FluNet database [6].

Table 3. Comparison of influenza positive and negative patients

	Influenza Pozitive	Influenza Negative	P
Age	41.1±18.7	47.1±13.6	0.31
Female/Male	8 / 10	7 / 9	0.96
Wbc	6.975±3.793	12.315±9.218	0.09*
Hb	13.9±1.3	14±1.5	0.73
Plt	161.5±44.22	216.62±74.57	0.02*
CRP	5.3±4.3	3.9±5.2	0.12
AST	47.7±41.2	40.2±39.2	0.76
ALT	41.8±38.9	29.8±17.6	0.79
CK	349.6±326.2	793.2±2398	0.20
Creatinine	1.53±1.92	1.48±1.81	0.71
Comorbidity	8 (%44.4)	12 (%75)	0.07
Mortality	3 (%16.7)	5 (%31)	0.32
Infiltration in chest X-ray	9 (%50)	11 (%68)	0.10

Influenza is an infectious disease that causes acute, contagious and characteristic epidemics, that progresses with fever, cough, headache, fatigue and muscle soreness, and that can cause death, although mortality is rare. It can affect all age groups. While epidemics are usually observed at the interval of 1-3 years, pandemics are rare. The pandemic alarm level was raised to 6 by the WHO in June 2009, shortly after H1N1 virus cases emerged in Mexico in April 2009 and spread to many countries [7]. According to the WHO data, influenza positivity was determined in 6224 of 63,813 samples in the May 2016 updates of the national influenza centre and national influenza laboratories of the other 90 countries. Influenza A was determined in 33.8% of the samples and influenza B was determined in 66.2% of the samples. While 79% of influenza A subtypes were H1N1, 29% of them were H3N2. However, influenza A was more frequent in 2016 in the data of Turkey. In our study, 19 patients had influenza positivity. While 84% of these patients had influenza A, 16% had influenza B. While 56% of influenza A subtypes were H1N1, 54% of them were H3N2. The results of our study are correlated with the data of Turkey.

The study of Saidel-Odes et al. found that in Israel, white blood cell (WBC) and platelet values were lower in H1N1 positive cases than in controls, whereas creatine phosphokinase levels were higher [8]. The study of Reyes et al. showed lower leukocytes values in H1N1 positive cases than in bacterial pneumonia [9]. In the study conducted by Şahbudak Bal et al., a significant difference was obtained in the platelet values between H1N1 positive and negative patients [10].In the study of Özlü et al., a statistically significant difference was also determined in the platelet values from the laboratory findings between H1N1 positive and negative cases [11].Gürgün et al. determined thrombocytopenia in influenza A (H1N1) cases significantly more frequently when compared to community-acquired pneumonia [12].In our study, upon comparing the laboratory values between influenza positive and negative patients, platelet counts were determined to be significantly lower in influenza-positive patients.

In our study, it was also statistically determined that the elevation in the white blood cell, neutrophil, creatinine, AST and ALT counts, comorbidity status, and infiltration in the chest radiography have an active role in the admission rate of patients to the intensive care unit. In the study in which Adıgüzel et al. examined H1N1 cases in the intensive care unit, the averages of AST, ALT, and CRP values were found to be high [13]. In the study of Jain et al., laboratory abnormalities in H1N1 positive patients were most frequently reported to be ALT and AST elevation, anemia, leukopenia, leukocytosis, and thrombocytopenia, respectively [14]. Based on these results, it can be said that the follow-up of the patients with a poor general condition, comorbidity, and abnormal laboratory parameters in an intensive care unit is essential.

In our study, upon investigating the relationship between the laboratory results of the patients and mortality, it was determined that influenza and influenza-like diseases progress with higher mortality in patients with high white blood cell, neutrophil, creatinine, and AST values. Mortality was found to also be high in patients with comorbidity. In the study of Özlü et al., significant results were obtained between H1N1 positivity, neutrophil, platelet, and BUN values and mortality in patients with pneumonia [11].

The result of these factors is that influenza has a wide range from a mild form of a spontaneously regressing disease to a severe disease table causing pandemics and increased mortality. It is more likely to be fatal in patients whose general condition is poor, whose laboratory parameters are impaired, and who have infiltration in the chest radiography. The close follow-up of these patients in the intensive care unit and a multidisciplinary physician approach are appropriate. Influenza progresses more severely in the presence of comorbid diseases. Therefore, the seasonal influenza vaccine has a great importance for people with comorbidity. There is a need for a campaign (e.g. public service announcements on TV, advertisements for raising awareness on billboards, hand brochures) aimed at raising public awareness and for family physicians and the Ministry of Health to promote adult vaccinations.

Competing interests

The authors declare that they have no competing interests.

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